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TITLE: Structural and Lithologic Study of Northern Coast Ranges
and Sacramento Valley, California

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ACCOMPLISHMENTS:

During the reporting period (July 1 to September 1, 1973) the following progress was made toward the objectives of the project:

1. A final map was completed (at a scale of 1:500,000) of the various kinds of linear features within Northern California from the latitude of San Francisco to the Oregon border. All ERTS-1 imagery for the period August, 1972 to July, 1973 was carefully examined and compared to evaluate the linear features with regard to seasonal changes and sun-angle. Several of the more prominent features detected on the imagery were selected for ground investigation. These areas were visited during August in an effort to determine the possible geologic causes for and geomorphic characteristics associated with each of the features. In a few cases, faulting or intense jointing is associated with the trace of the linear features, in others alignments of stream segments, anomalous offsets in otherwise continuous ridges, and linear alignment of small saddles along a series of ridges are the only surface features that could be observed on the ground. Because of the dense vegetative cover in the Coastal and Sierran Regions not all linear features could be found on the ground or their geologic causes evaluated.

2. A photomosaic of Northern California (Scale 1:1 million) was prepared from photos of MSS Band 6. This map was used for field work and general reconnaissance.

3. The analysis of the geomorphic regions, or regimes, within Northern California has been completed. The major geomorphic regimes defined from ERTS-imagery coincide on a regional scale reasonably well with known physiographic provinces (Fenneman, 1938; Thornbury, 1965), but they differ markedly in detail. These major regimes (Figure 1) can be further subdivided on the basis of geologic structure, lithology, or both. The chief differences in the major regimes are in the Coast Range Province, where it is possible from ERTS to divide the Coast Ranges Province into the Coastal Belt ("C" on Figure 1), the Franciscan Belt ("F" on Figure 1) and the Metamorphic Belt ("M" on Figure 1). Each of these regimes has been further subdivided on the basis of similar or clearly contrasting geomorphic characteristics.

SIGNIFICANT RESULTS

The pattern of linear systems within the project area has been extended into the western foothill belt of the Sierra Nevada. The chief pattern of linear features in the western Sierran foothill belt trends about N. 10-15° W. but in the vicinity of the Feather River (Lat. 39°30'N., Long. 121°15'W.) the trend of the features abruptly changes to about N. 50-60W. and appears to be contiguous across the Sacramento Valley with a similar system of linear features in the Coast Ranges (the Central System of previous reports). The linear features in the Modoc Plateau and Klamath Mt. areas appear unrelated to the systems detected in the Coast Ranges or Sierran foothill belt. Although the change in trend of the Sierran structural features has been previously suggested and the interrelationship of the Klamath Mt. region with the northern Sierra Nevadas has been postulated, the data obtained from the ERTS imagery strengthens these notions and provides for the first time evidence of a direct connection of the structural trends within the alluviated part of the Sacramento Valley. In addition rocks of Pleistocene and Holocene age are offset by some of the linear features seen on ERTS imagery and hence may record the latest episode of geologic deformation in north-central California.